

**REMARKS**

Reconsideration and withdrawal of the rejections of the application are respectfully requested in view of the amendments and remarks herewith, which place the application into condition for allowance.

**I. STATUS OF CLAIMS AND FORMAL MATTERS**

Claims 74-97 are pending in this application. Claims 1-29 and 52-73 are withdrawn but have not been cancelled, claims 30-51 are cancelled and claims 74-97 are added, without prejudice.

No new matter is added by these amendments.

It is submitted that these claims, as originally presented, were in full compliance with the requirements of 35 U.S.C. §112. Changes to these claims, as presented herein, are not made for the purpose of patentability within the meaning of 35 U.S.C. §101, §102, §103, or §112. Rather, these changes are made simply for clarification and to round out the scope of protection to which Applicants are entitled. Support for the new claims is found throughout the specification and from the cancelled claims.

**II. 35 U.S.C. §112, SECOND PARAGRAPH, REJECTIONS**

Claims 30-51 were rejected under 35 U.S.C. §112, second paragraph, for allegedly being indefinite. The rejection is traversed.

The submission of new claims renders the rejection moot. Further, Applicants disagree with the Examiner's allegations that certain terms are unclear. For example, a skilled artisan would readily understand that the term "neurite" is the combination of axon and dendrites, which

combination forms part of a neuron; that the term “multi-layer” may include several layers of one type of liquid crystal material or several layers of different types of liquid crystal material; that “combined alignment layer” is a combination of materials such that the properties of a separate alignment layer and of a liquid crystal layer are combined; and that the term “cell” may mean any cell, and that a cell may comprise neurons.

Further, Applicants disagree that terms such as “P6a12” are unclear. Such terms are not trademarks and find support on page 8 of the application.

Reconsideration and withdrawal of the Section 112 and 101 rejections are, therefore, respectfully requested.

### **III. 35 U.S.C. §§102/103 REJECTIONS**

Claims 30-34, 39 and 45 were rejected under 35 U.S.C. §102(b) as allegedly being anticipated by U.S. Patent No. 5,686,549 to Grainger et al. (“Grainger”); claims 30-33 and 39 were rejected under 35 U.S.C. §102(b) as being allegedly anticipated by U.S. Patent No. 5,510,628 to Georger, Jr. et al. (“Georger”); claims 30, 32-35, 37-43, 48 and 51 were rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over U.S. Patent No. 6,061,113 to Kawata (“Kawata”); claim 36 was rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over U.S. Patent No. 4,857,227 to Adams et al. (“Adams”); and claims 39, 46, 47 and 49-50 were rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over Grainger in view of Kawata. The rejections will be collectively addressed and respectfully traversed. The cited documents, either alone or in combination fail to teach, suggest, enable, or provide the motivation for a skilled artisan to practice the instantly claimed invention.

The instant invention is directed to a substrate structure for neurite outgrowth having a basic structure; at least one neuron on top of said basic structure; at least one alignment layer or

a combined alignment layer, said combined alignment layer comprised of monomeric or polymeric materials having liquid crystalline and/or amorphous elements; and a mono- or multiplayer of liquid crystal material on said at least one alignment layer, wherein said polymeric material is selected from the group consisting of polyester, polypeptide, polycacrylamide, polyvinyl alcohol, polyacrylate, polymethacrylate, polyurea and polyamide. Such an invention is neither taught, enabled or suggested in the cited documents.

More specifically, Grainger, either alone or in combination, fails to disclose neurite outgrowth. Instead, Grainger relates to a polymer attached to a substrate by anchoring chains. Applicants disagree with the Examiner's allegations that "Grainger et al. teaches that the polymer is bound ... in a predetermined alignment (pattern) as points of attachment for cell growth thus acting as an alignment layer on the substrate for cell growth." Column 15, lines 10-20, of Grainger only mentions antibodies that are attached to the polymeric article and can thus be used in analytical techniques, such as immunoassays. This clearly is not cell growth, let alone neurite outgrowth. The process of "cell growth" involves the doubling of the genetic material of a cell, followed by a subsequent cell division. In contrast thereto, and as instantly claimed, neurite outgrowth is the formation and extension of a neuron by way of neurites, the term neurite relating to the combination of axon and dendrites. Therefore neurite outgrowth does not involve the doubling of genetic material and subsequent cell division. Grainger, therefore, is defective as evidence or unpatentability.

Georger is equally distinguishable. Nowhere in the portions of Georger cited by the Examiner is there a disclosure, enabling recitation or suggestion of liquid crystalline material as a separate layer or in a combined alignment layer. By contrast, one of the important features of the present invention is the use of liquid crystalline material, which allows for a reversible

switching, whereby the structure on the surface of the substrate can be altered for controlling and orienting the neurite outgrowth. Further, there is no teaching in Georger of a combined alignment layer having polymeric material selected from the group consisting of polyester, polypeptide, polyacrylamide, polyvinylalcohol, polyacrylate, polymethacrylate, polyurea and polyamide, or said combined alignment layer comprising monomeric material, said polymeric material and said monomeric material being liquid crystalline or comprising both liquid crystalline and amorphous elements. Thus, the Georger patent is insufficient anticipatory evidence.

Kawata, either alone or in combination, also fails to teach, suggest or motivate a skilled artisan to practice the instantly claimed invention. Kawata relates to an optical compensatory sheet having a transparent support, an orientation layer and an optically anisotropic layer in order. The optically anisotropic layer is said to contain an aligned and fixed discotic liquid crystal compound. Further, the orientation layer aligns the discotic liquid crystal compound. The sheets described in Kawata, however, are used in a liquid crystal display. Nowhere is there a teaching or suggestion, however, of orienting neurite outgrowth. Nor is there a teaching or suggestion of the instantly claimed substrate structure.

Adams is equally defective. Adams relates to ferroelectric liquid crystal compounds of the smectic type. More specifically, the patent relates to mixtures of smectic liquid crystal compounds which exhibit a ferroelectric, chiral smectic C phase and finding application in electrooptic display devices. There is no teaching or disclosure, however, of the instantly claimed substrate structure for neurite outgrowth.

It is well-settled that picking and choosing portions from disparate references in order to formulate an obviousness rejection is impermissible. Further, "obvious to try" is not the standard

upon which an obviousness rejection should be based. *See In re Fine*. And as "obvious to try" would be the only standard that would lend the Section 103 rejection any viability, the rejection must fail as a matter of law. Therefore, applying the law to the instant facts, the rejection is fatally defective and should be removed.


Consequently, reconsideration and withdrawal of the Section 102 and 103 rejections are believed to be in order and such actions are respectfully requested.

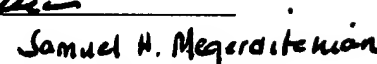
**CONCLUSION**

In view of the foregoing amendments, it is believed that all of the claims in this application are patentable, and early and favorable consideration thereof is solicited.

Respectfully submitted,  
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